

**Performance Work Statement
For
12.1 MT Highly Enriched Uranium – Down-blending Services and Low
Enriched Uranium Inventory
(September 26, 2008)**

1.0 BACKGROUND

The Highly Enriched Uranium (HEU) Disposition Program is currently responsible for disposing of 217 metric tons (MT) of HEU, as follows:

In 1994, the President declared 174 MT of HEU to be excess to national security. In 1996, after conducting appropriate NEPA analysis, DOE issued a Record of Decision that announced the material would be down-blended to low-enriched uranium (LEU) to make it non-weapons-usable, and subsequently used as nuclear reactor fuel to the extent practicable. Of this total, 156 MT can be down-blended for this use. The remaining 18 MT are spent nuclear fuel and low equity discards that are not planned to be recovered.

In 2005, the Department also declared that an additional 200 MT of HEU will never again be used as fissile material in nuclear weapons. Of that amount, 160 MT was designated for use as Naval Reactor fuel, 20 MT was designated for research and space reactor requirements, and 20 MT was designated for down-blending to LEU. In addition to the 20 MT designated for down-blending, it is expected based on historical experience that Naval Reactors will reject approximately 20 percent of its 160 MT allotment. As a result, it is expected that the HEU Disposition Program will need to down-blend an estimated additional 32 MT. This amount can change if NR rejects more or less than has historically been the case.

The program has already committed to various down-blending projects 161 MT of the 217 MT of HEU for which it is responsible, and has eliminated approximately 102 MT of weapons-usable HEU by down-blending it to LEU for use in power and research reactors in the U.S. and abroad. Another 15 MT of HEU has been shipped to the down-blender for processing; therefore, the program has effectively disposed of approximately 117 MT of surplus HEU to date. The program has substantially reduced holdings of fissile materials throughout the Department of Energy complex, rid the world of approximately 2,450 weapons worth of unneeded bomb material, helped reduce civil use of HEU worldwide by providing replacement LEU fuel for research reactors that previously used HEU fuel, and made a significant contribution to electricity supplies. The program is moving forward with plans for the remaining 56 MT of HEU that is currently unallocated to any project.

2.0 CONTRACT OVERVIEW

The overall objectives of the procurement are to meet non-proliferation objectives by down-blending approximately 12.1 MT of HEU below 5% enrichment, reduce the inventory of HEU, reduce the costs associated with storing and securing HEU, and recover the value of the HEU where feasible.

3.0 PROGRAM SCOPE

3.1 The Contractor shall receive 12.1 MT of HEU from alloyed and unalloyed metals, oxides, compounds, sources and standards, and reactor fuel, chemically process the HEU to prepare it for down-blending, procure necessary unobligated diluent, and down-blend the HEU into Derived LEU. All HEU provided to the Contractor shall be down-blended and available for shipment to the Government as specified in the PWS and with the Section J attachment entitled, "Holding Agreement".

3.2 The Contractor shall store the Derived LEU in a Government account in accordance with the Holding Agreement.

3.3 The Contractor shall convert 40 MT of the Government LEU to, or exchange it for, UF₆, and retain that quantity of UF₆ in storage in the Government account for the duration of the contract. Upon three years notice from the Government, the Contractor shall convert up to the remainder of the Government LEU to, or exchange it for, UF₆, and prepare the UF₆ for Physical Delivery to the Government, as needed, in accordance with the Holding Agreement.

4.0 TECHNICAL REQUIREMENTS

4.1 Receipt, Inventory of HEU, and Return of Shipping Containers

4.1.1 The Contractor shall take delivery of approximately 12.1 MT of HEU in accordance with the schedule detailed in the Section J attachment entitled "Planned HEU Delivery Schedule." The 12.1 MT consists of HEU Alloyed and Unalloyed Metal, HEU Oxide and Compounds, HEU Reactor Fuel and Sources and Standards as specified in Section J attachment entitled, "HEU Material Summary."

4.1.1.1 Unless otherwise agreed to by the Government and the Contractor, HEU material delivered to the Contractor will meet the description provided in the Section J, attachment entitled "HEU Material Summary."

4.1.1.2 The Government will provide the Contractor an analysis of the isotopic and chemical properties of HEU prior to any HEU shipment to the Contractor. At a minimum, the following information shall be provided in the Government analysis:

- (i) Level of all uranium isotopes ($\mu\text{g/g}^{235}\text{U}$);
- (ii) ^{99}Tc levels ($\mu\text{g/g}^{235}\text{U}$);
- (iii) Alpha activity from Neptunium and Plutonium (Bq/gU);
- (iv) Gamma activity from fission products for each detectable gamma emitting fission product. The values obtained by multiplying the activity (Bq/gU) of each parent nuclide species by the appropriate mean gamma energy per disintegration (MeV/d) shall be summed (MeV Bq/dkgU). The presence of all identified gamma emitting fission product nuclides will be recorded and each contribution included in the total; and
- (v) Agreed upon elemental impurities.

4.1.1.3 Prior to HEU shipment, the Contractor and the Government will agree on additional sampling needed for material characterization and/or to be used to determine the suitability of the HEU for down-blending into commercially acceptable LEU.

4.1.1.4 The Government will provide the opportunity to the Contractor to observe the sampling or loading of HEU, if requested. The Contractor shall only request access for personnel meeting site requirements, including but not limited to security clearances and other training. If the Contractor requests an opportunity to observe sampling or loading, the Government will notify the Contractor of the date(s) and place(s) for observance of such events.

4.1.1.5 The Contractor shall process uranium samples once released by the Government or, as instructed by the Government, shall return the samples to the designated Government facility.

4.1.1.6 If the HEU material delivered by Government to the Contractor fails to conform to the specifications set forth in the Section J, attachment entitled "HEU Material Summary," and the Contractor cannot utilize the material through selective blending with conforming HEU, the Government may elect to replace such non-conforming HEU with conforming HEU or may reduce the quantity of HEU to be delivered under this contract. Such a change will be processed in accordance with FAR clause 52.243-01 "Changes – Fixed Price – Alternate II." The Government will arrange for the removal of any non-conforming HEU. The Contractor shall submit a written notice of non-conformance to the CO no later than forty-five (45) calendar days after receipt of the analytical data. The notice of non-conformance shall include analytical data supporting the Contractor's assessment.

4.1.1.7 A detailed HEU shipment schedule shall be defined and agreed upon between the parties on a quarterly basis, however, the detailed schedule shall be consistent with Section J attachment entitled, "Planned HEU Delivery Schedule." In the event that the parties cannot reach an agreement as to the quarterly shipping schedule, the Government shall only be bound to Section J attachment entitled, "Planned HEU Delivery Schedule." In the event the Contractor is unable to receive and/or process HEU in accordance with such schedules, the Contractor shall immediately notify the CO of any resulting delay, request an alternate delivery or performance date, and identify any impacts to the processing caused by such a delay. Although the Government agrees to make a good faith effort to accommodate such requests, the Government is not bound to make accommodations.

4.1.1.8 The Contractor shall inventory the HEU shipped by the Government. The Contractor shall physically segregate delivered HEU from other HEU in its possession through the weighing, processing, and accountability sampling steps identified in this contract.

4.1.2 The Contractor shall receive HEU at a facility located in the United States and licensed by the U.S. Nuclear Regulatory Commission (NRC) to possess and process HEU.

4.1.2.1 The Contractor shall procure all unobligated diluent necessary to down-blend the HEU to 4.95% Derived LEU.

4.1.2.2 The processing facility shall be located in the United States and have the capability of recovery, purification and down-blending of Category I quantities of HEU to Derived LEU.

4.1.3 The Government will deliver HEU to the Contractor in Government-owned, leased, or loaned containers, and Cargo Restraint Tie-downs (CRTs) or Cargo Pallet Assemblies (CPAs). The "delivery" of HEU to the Contractor shall be deemed to occur upon the physical receipt of the HEU at the Contractor's processing facility, located in the United States. A copy of the Form DOE/NRC-741 and analytical data shall accompany the delivery of HEU to the Contractor. The Contractor shall physically segregate HEU subject to this contract from any other HEU through the weighing, processing, and accountability sampling steps.

4.1.3.1 Shipping containers containing HEU will be shipped directly from the Government facility, or its designated site. The primary and secondary shipping containers shipped to the Contractor will not exceed a smearable alpha contamination limit of 220 dpm/100cm² on the outside of the containers. Within twenty-one (21) calendar days after receipt of the HEU, or as otherwise agreed between the Government and the Contractor, the Contractor shall return empty shipping containers (including any spacers if used), CRTs and CPAs to the designated Government facility.

4.1.3.2 Empty shipping containers, CRTs, and CPAs returned to the Government shall be palletized, banded or shrink wrapped and a tamper indicating device applied. Items that are to be returned to the Government shall include the empty shipping containers (including any spacers, if used), CRTs, and CPAs. Convenience containers, wrappings, and other packing material (for example, the aluminum extrusions containing the unclad elements, glass/plastic bottles, slip-top and screw-top cans, bales, etc.) are not to be returned to the Government and shall be disposed of by the Contractor. The Contractor shall palletize empty shipping containers on metal pallets to be provided by the Contractor. A customized metal pallet is required for the ES-3100 shipping container. Each pallet of empty shipping containers shall be labeled "Empty." CRTs and CPAs shall be banded and a TID applied to each individual CRT and CPA.

4.1.3.3 Prior to return of shipping containers, the Contractor shall radiologically survey all of the returned items for loose and fixed activity (alpha and Beta-gamma) to meet both the Government and the receiving site's specific requirements [220 dpm/100cm²]. Surveys shall include all of the external surfaces of the shipping container drums and any of the internal areas that are accessed/opened during the loading/unloading process. It is noted that these surveys are not intended to be 100 percent surveys for the "free release" of the containers and their contents. The Contractor shall return all of the survey data (along with the items) to the Government for its use in radiologically assessing the receipt, control, and reuse of these items. The Government will return the metal pallets to the Contractor within fourteen (14) calendar days of receipt by the Government.

4.1.3.4 Title to and/or responsibility for shipping containers, CRTs and CPAs shall remain with the Government. In the event containers are identified by the Government as non-returnable, the Contractor shall take title to and responsibility for the disposal of the containers. The Contractor shall maintain the returnable containers, CRTs, and CPAs in good condition and shall not use them for any materials other than the uranium shipped therein, until returned to the Government. In the event that the containers, CRTs, or CPAs are not returned to Government in the same condition as provided, the Contractor shall reimburse the Government with the market value for the replacement or the actual cost of the repair.

4.1.4 The Contractor shall account for and inventory the HEU shipped by the Government and shall enter into a Shipper/Receiver Agreement (SRA) with the Government and the Government's designated shipping facility Contractor, in accordance with Section H clause entitled "Shipper/Receiver Agreement (SRA)," to document the methods used to establish accountability values for the HEU.

4.2 Processing and Down-Blending Requirements of HEU to LEU

4.2.1 The Contractor shall have down-blended forty (40) MT of Derived LEU within one year after delivery of HEU begins. All quantities of HEU provided to the Contractor shall be down-blended within one year of final delivery of HEU to the Contractor. The Contractor shall down-blend the HEU to LEU at a 4.95% assay. Derived LEU shall meet the specifications provided in the Section J attachment entitled "Specification for LEU Derived from HEU." The UF₆ delivered to the Government or its designee shall meet the ASTM International (ASTM) Specification C996-04^{E1}. Any Contractor requested deviation for LEU not meeting the specifications provided in the Section J attachment entitled "Specification for LEU Derived from HEU" shall be submitted by the Contractor to the CO for approval. The Contractor shall establish an account in the name and for the benefit of the Government which represents the quantities of Government-owned LEU (Government LEU Account) down-blended. All Derived LEU shall be stored in accordance with paragraph 4.3 below and the Holding Agreement.

4.2.2 The Contractor shall perform selective batch processing in the uranium recovery, purification and/or down-blending operations to dilute certain impurities, such as transuranics (TRU) and fission products.

4.2.3 The Contractor shall establish accountability values for the Derived LEU as it is generated.

4.2.4 The Government recognizes that some of the uranium furnished under this contract may be lost in processing or may remain in residues from which it cannot be economically recovered. Unless otherwise agreed to in writing by the Government, the allowable uranium process losses are limited to One and one half (1 ½) percent of the total uranium input at dissolution for processing under this contract. Both that uranium lost in processing and that uranium not economically recoverable shall be considered to be "process losses." The title to authorized uranium process losses shall be deemed abandoned by the Government and shall vest in the Contractor.

4.2.4.1 The Contractor shall reimburse the Government for the value of the uranium that is not returned and is in excess of the authorized uranium process losses in the performance of the work.

4.2.5 The Contractor shall take title to and dispose of all of the waste streams resulting from activities performed under this contract.

4.3 Storage of LEU and Preparation for Shipment of UF₆

4.3.1 The Contractor shall store the LEU in the Government's LEU Account in accordance with the Holding Agreement (including, but not limited to, the requirement that the Derived LEU remain within the United States, except as otherwise agreed to in advance by the Contracting Officer (CO)). The Contractor shall have all Derived LEU available for shipment to the Government as specified in the PWS and Holding Agreement, within one year of final delivery of the HEU to the Contractor. The Derived LEU shall be converted to or exchanged for UF₆ and prepared for Physical Delivery to the Government, as needed, in Contractor-furnished cylinders.

4.3.2 In accordance with the Holding Agreement, 40 MT of Government owned LEU in the form of UF₆ from the Government LEU Account shall be available to the Government one year after delivery of HEU begins, 40 MT of LEU in the form of UF₆ shall be available for Physical Delivery to the Government within 30 days of receipt of written direction from the COR, and up to 100% of the LEU down-blended to date shall be available for Physical Delivery to the Government in the form of UF₆ within three years after written direction from the COR and 100% of the Derived LEU shall be available one year after delivery of HEU ends.

4.4 Reporting Requirements

The Contractor shall submit all reports in accordance with the Section J attachment entitled "Reporting Requirements Checklist."

5.0 Quality Assurance

5.1.1 The Contractor shall comply with quality assurance requirements as established by Nuclear Quality Assurance manual (NQA-1), Quality Assurance Program Requirements for Nuclear Facilities or another equivalent nuclear industry standard, unless otherwise specified in this contract.

5.1.2 The Contractor shall maintain its established quality assurance program meeting the requirements of ANSI/ASME NQA-1 or another equivalent nuclear industry standard, unless otherwise specified in this contract. The extent to which NQA-1 applies is dependent upon the nature and scope of work to be performed, and the relative importance of the items or services being produced.

5.1.3 The quality assurance program, including procedures, processes and products shall be documented and subject to review by the CO or Contracting Officer's Representative. The CO may furnish written notice of the acceptability of the Contractor's quality assurance program.

5.1.4 All supplies and services under the contract, whether manufactured or performed within the Contractor's facility or at any other source, shall be controlled at all points necessary to assure conformance with contractual requirements.

5.1.5 The uranium product quality shall be in accordance with the specifications provided in the Section J attachment entitled "Specification for LEU Derived from HEU."

6.0 SERVICE DELIVERY SCHEDULE

Performance Objective	PWS Paragraph	Performance Threshold
Acceptance of HEU	4.1	Accept delivery of HEU in accordance with Section J, Attachment entitled "Planned HEU Delivery Schedule."
Down-blend HEU	4.2.1	<p>40 MT of Derived LEU down-blended within one year after delivery of HEU begins.</p> <p>All quantities of HEU down-blended within one year of final delivery of the HEU to the Contractor.</p> <p>Government LEU Account established representing the quantities of Government-owned LEU down-blended.</p> <p>Derived LEU meets specifications in Section J Attachment entitled "Specification for LEU Derived from HEU."</p>
Provide UF ₆	4.2.1	UF ₆ shall meet ASTM specifications.
Store Derived LEU	4.3.1	Derived LEU shall be stored in a Government Account and shall not be physically removed out of the United States, except as otherwise agreed to in advance by the CO.
Have UF ₆ ready for shipment	4.3.2	<p>40 MT of Government owned LEU in the form of UF₆ from the Government LEU Account shall be available to the Government one year after delivery of HEU begins.</p> <p>40 MT of LEU in the form of UF₆ shall be available for Physical Delivery to the Government within 30 days of receipt of written direction from the COR.</p> <p>100% of the LEU in the Government LEU Account in the form of UF₆ shall be available for Physical Delivery to the Government within 3 years after written</p>

		direction from the COR, or on the last day of the contract period of performance whichever is earlier.
Reports	4.4	100% of reports delivered on time in accordance with Section J, Attachment entitled "Reporting Requirements Checklist."

HOLDING AGREEMENT

September 26, 2008

This HOLDING AGREEMENT ("Agreement") provides supplemental requirements for the storage of Government-owned LEU under Contract Line Item 0002.

ARTICLE I. ESTABLISHMENT OF GOVERNMENT'S LEU ACCOUNT

In accordance with the Contract, the Contractor shall store Derived LEU and make available to the Government in accordance with ARTICLE IV below the quantity of LEU in the form of UF₆ that resulted from the conversion or exchange of the Derived LEU produced under the Contract (Government-owned LEU). The Contractor shall establish an account in the name and for the benefit of the Government which represents the quantities of Government-owned LEU (Government LEU Account). The Government LEU Account will be credited and debited, in accordance with the Contract and ARTICLE IV below.

ARTICLE II. CONTRACTOR'S RIGHT TO USE REMAINDER LEU

Subject to the terms of the Contract and this Agreement, the Contractor may use as working stock the total balance of the Government LEU in the Government's LEU Account less the 40 MTU in the form of UF₆ that shall be physically maintained at the Contractor's facility or facilities in accordance with ARTICLE IV below (Remainder LEU). The Government acknowledges that the Remainder LEU is fungible, may exist in various chemical forms at various times, and that the Contractor is not required to maintain, identify, or allocate separate physical inventories of the Remainder LEU. The Government agrees that the Remainder LEU may be commingled with the Contractor's working stock inventory of LEU. The Contractor shall ensure that no other party has title to or any other interest conflicting with the Government's title to the Remainder LEU. The Contractor agrees to maintain the Remainder LEU within the United States at all times, unless prior written authorization is provided to the Contractor by the Contracting Officer. The Remainder LEU shall continue to meet the specifications of Section J Attachment 5, although the Contractor is not required to continuously re-analyze its working stock inventory of LEU. The Contractor shall not sell, transfer, barter, or otherwise dispose of the Remainder LEU. The Contractor shall not exchange or "book transfer" the Remainder LEU for non-U.S. LEU located outside of the United States, unless prior written authorization is provided to the Contractor by the Contracting Officer. Nothing in this ARTICLE II, however, shall require the Contractor to obtain Contracting Officer approval for performing uranium exchanges or book transfers, so long

as the uranium contained in the Government's LEU Account remains within the United States.

ARTICLE III. INSURANCE

The Contractor shall maintain, at all times when it has possession, custody, or control of Government-owned LEU or other assets under this Agreement, insurance adequate to cover the risk of loss of the Government-owned LEU. All insurance required of the Contractor shall be for the protection of the Government against risk and liabilities in connection with the Government-owned LEU. A certificate of insurance shall be furnished to the Contracting Officer at least thirty (30) days prior to the commencement of delivery of the Government-owned LEU to the storage facility.

Each policy of insurance against loss or damage to the Government's property shall name the United States of America (Department of Energy) as loss payee as its interest may appear and shall contain a loss payable clause reading substantially as follows:

"Payments for losses under the Contractor's property insurance related to losses of the Government-owned LEU, if any, shall be adjusted with the Contractor and the proceeds shall be payable to the Contractor and to the Treasurer of the United States of America, as its interests may appear."

Additionally, each property policy of insurance shall contain an endorsement reading substantially as follows:

"The insurer waives any right of subrogation against the United States of America which might arise by reason of any payment made under this policy."

ARTICLE IV. QUANTITY AND SCHEDULE

The Contractor shall physically store and maintain 40 MTU of Government owned LEU in the form of UF₆ in the Government LEU Account at its facility, which shall be in the United States, during the term of this contract. Forty (40) MT of UF₆ from the Government LEU Account shall be available for shipment to the Government no later than two years after initial HEU is delivered to the Contractor for down-blending.

Withdrawals from the Government LEU Account will be accomplished by the COR providing written direction to the Contractor, with a copy to the CO. Within 30 days of receipt of written direction from the COR, the Contractor shall have available for Physical Delivery to the Government or its designee up to 40 MTU of Government owned LEU in the form of UF₆ from the

Government LEU Account in Contractor-furnished industry standard cylinders. Within 150 days of the Government or its designee taking delivery, the Contractor shall replace the quantity of UF₆ delivered, ensuring that a minimum of 40 MTU of Government owned LEU in the form of UF₆ is in the Government LEU Account and physically located at the Contractor's facility and again available on 30 days notice. During the 150 day period following a delivery, the Government may give written direction to withdraw another 40 MTU in the form of UF₆ in the Government LEU Account. This delivery shall occur either 30 days from written direction from the COR or at the end of the 150 day restock period, whichever is longer.

Up to 100% of the LEU in the Government LEU Account shall be available for Physical Delivery in the form of UF₆ within 3 years after written direction from the Government. Except for the 150 days following a delivery to the Government, the Contractor shall retain in storage a minimum of 40 MTU of Government owned LEU in the form of UF₆. The process of providing UF₆ in accordance with the specification contained in Section J, Attachment 1 from retained inventory and replenishing the retained inventory shall continue until the Government has taken custody of all LEU in the Government LEU Account.

UF₆ delivered to the Government or its designee shall not contain any foreign obligations.

ARTICLE V. WARRANTY

Pursuant to "Inspection of Supplies—Fixed Price" clause (52.246-2) in Section E of the contract, the UF₆ released hereunder by the Contractor shall conform to the specification contained in Section J, attachment 1 entitled, "Performance Work Statement for 12.1 MT Highly Enriched Uranium – Down-Blending Services and Low Enriched Uranium Inventory, and attachment 5 entitled, "Specification for LEU Derived from HEU."

ARTICLE VI. CERTIFICATIONS

The Contractor will certify annually that LEU is being stored in compliance with this Agreement.

REPORTING REQUIREMENTS CHECKLIST

1. PROGRAM/PROJECT TITLE 12.1 MT Highly Enriched Uranium – Down-blending Services and Low Enriched Uranium Inventory		2. IDENTIFICATION NUMBER DE-AC52-09NA28609													
3. PARTICIPANT NAME AND ADDRESS TBD															
4. PLANNING AND REPORTING REQUIREMENTS <div style="text-align: right; margin-right: 20px;"><u>Frequency</u></div> <p>A. General Management</p> <p><input type="checkbox"/> Management Plan (requires COR approval) <input type="checkbox"/> Status Report <input type="checkbox"/> Summary Report</p> <p>B. Schedule/Labor/Cost</p> <p><input type="checkbox"/> Milestone Schedule/Plan <input type="checkbox"/> Labor Plan <input type="checkbox"/> Facilities Capital Cost of Money Factors Comp. <input type="checkbox"/> Contract Facilities Capital and Cost of Money <input type="checkbox"/> Cost Plan <input type="checkbox"/> Milestone Schedule/Status <input type="checkbox"/> Labor Management Report <input type="checkbox"/> Cost Management Report</p> <p>C. Exception Reports</p> <p><input type="checkbox"/> Conference Record <input type="checkbox"/> Hot Line Report</p> <p>D. Performance Measurement</p> <p><input type="checkbox"/> Management Control System Description <input type="checkbox"/> WBS Dictionary</p> <p><input type="checkbox"/> Index <input type="checkbox"/> Element Definition</p> <p><input type="checkbox"/> Cost Performance Reports</p> <p><input type="checkbox"/> Format 1 - WBS <input type="checkbox"/> Format 2 - Function <input type="checkbox"/> Format 3 - Baseline</p>		<div style="text-align: right; margin-right: 20px;"><u>Frequency</u></div> <p>E. Financial Incentives</p> <p><input type="checkbox"/> Statement of Income and Expenses <input type="checkbox"/> Balance Sheet <input type="checkbox"/> Cash Flow Statement <input type="checkbox"/> Statement of Changes in Financial Position</p> <p><input type="checkbox"/> Loan Drawdown Report <input type="checkbox"/> Operating Budget <input type="checkbox"/> Supplementary Information</p> <p>F. Technical</p> <p><input type="checkbox"/> Notice of Energy R&D Project (Required with any of the following) <input type="checkbox"/> Technical Progress Report (Annual Accomplishment Report) <input type="checkbox"/> Draft for Review <input type="checkbox"/> Final for Approval</p> <p><input type="checkbox"/> Topical Report <input type="checkbox"/> Final Technical Report</p> <p><input type="checkbox"/> Draft for Review <input type="checkbox"/> Final for Approval</p> <p><input type="checkbox"/> Software <input type="checkbox"/> Other (Specify):</p> <p>G. Environment, Safety & Health</p> <p><input type="checkbox"/> (Specify)</p>													
5. FREQUENCY CODES <table style="width: 100%;"><tr><td>A - As Required</td><td>BM — Bi-Monthly</td><td>S - Semi-Annually</td></tr><tr><td>C - Change to Contractual Agreement</td><td>M - Monthly</td><td>X - With Proposal/Bid/Application or with Significant Changes</td></tr><tr><td>F - Final (end of effort)</td><td>O - Once After Award</td><td>Y - Yearly or Upon Renewal of Contractual Agreement/Revision of</td></tr><tr><td>D — Daily</td><td>Q - Quarterly</td><td>Task Assignment</td></tr></table>				A - As Required	BM — Bi-Monthly	S - Semi-Annually	C - Change to Contractual Agreement	M - Monthly	X - With Proposal/Bid/Application or with Significant Changes	F - Final (end of effort)	O - Once After Award	Y - Yearly or Upon Renewal of Contractual Agreement/Revision of	D — Daily	Q - Quarterly	Task Assignment
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6. SPECIAL INSTRUCTIONS (ATTACHMENTS) <table style="width: 100%;"><tr><td><input checked="" type="checkbox"/> Report Distribution List/Addresses (See attached)</td><td><input type="checkbox"/> Analysis Thresholds</td></tr><tr><td><input type="checkbox"/> Reporting Elements</td><td><input type="checkbox"/> Work Breakdown Structure</td></tr><tr><td><input type="checkbox"/> Due Dates within 20 days after reporting period unless noted</td><td><input checked="" type="checkbox"/> Other (See attached)</td></tr></table>				<input checked="" type="checkbox"/> Report Distribution List/Addresses (See attached)	<input type="checkbox"/> Analysis Thresholds	<input type="checkbox"/> Reporting Elements	<input type="checkbox"/> Work Breakdown Structure	<input type="checkbox"/> Due Dates within 20 days after reporting period unless noted	<input checked="" type="checkbox"/> Other (See attached)						
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7. PREPARED BY <div style="display: flex; justify-content: space-between; width: 100%;"><div>_____ (Signature)</div><div>_____ (Date)</div></div>		8. REVIEWED BY <div style="display: flex; justify-content: space-between; width: 100%;"><div>_____ (Signature)</div><div>_____ (Date)</div></div>													

(2-06)

6. SPECIAL INSTRUCTIONS (Attachments)

The Contractor shall provide reports to the Government as follows:

- (1) Down-blending Progress Report (monthly):
Monthly progress reports documenting the quantity of HEU received; the quantity of HEU down-blended; the quantity of LEU produced; and the quantity of LEU shipped. The reports shall at minimum provide the quantity of total U and U-235 in each category and inventory source provided to the Contractor with each shipment for both the current month and for the program to date. Reports shall be provided within ten (10) working days following the end of a calendar month.
- (2) LEU Accounting Report (quarterly):
The Contractor providing storage for the Government-owned LEU inventory shall provide to the Government, within 20 working days following the end of each calendar quarter, a quarterly account statement of the quantities of LEU received, the quantities withdrawn from the inventory by the Government, and the quantities that remain in storage.
- (3) Special Nuclear Material (SNM) Reconciliation Report (annually):
An annual SNM reconciliation report certified by the Contractor MC&A official for uranium received, processed, shipped, and delivered to the Government. The reconciliation report will document the uranium balance by each batch or item and referenced to its DOE/NRC Form 741 receipt where applicable, and shall include receipts, transfers, and shipments, and process losses. The reconciliation report shall be submitted to the COR by January 1 and shall cover the period October 1 through September 30 of the previous government fiscal year.
- (4) Final Down-blending Report (one time end of effort):
A final (end of effort) down-blending report that documents the SNM balance (HEU receipts, HEU returns, uranium diluent received and processed, LEU generated, LEU exchanged or converted to UF_6 , and process losses), identifies deviations, and that establishes the financial liability submitted to the COR within 60 working days following the final material balance and certification and or transfer of product.

Report Distribution List

<u>Report/Plan</u>	<u>Form No. (if any)</u>	<u>Frequency</u>	<u>Copies</u>	<u>Address</u>
Down-blending Progress Report	N/A	M	2, 1, 1	A, B, C*
LEU Accounting Report	N/A	Q	2, 1, 1	A, B, C*
SNM Reconciliation Report	N/A	A	2, 1, 1	A, B, C*
Final Down-blending Report	N/A	F	2, 1, 1	A, B, C*

*Hard copies of the reports shall be mailed via regular mail to addresses A and B listed below. One electronic copy shall be submitted to the COR listed in Section G. The front page of each report and a copy of each transmission page submitted to the COR shall be submitted electronically to address C listed below.

List of Addresses

- | | |
|--|---|
| A. National Nuclear Security Administration
Y-12 Site Office
Attn: TBD | B. National Nuclear Security Administration (NA-26)
Office of Fissile Materials Disposition
Attn: TBD |
|--|---|
-
- | |
|--|
| C. U. S. Department of Energy
NNSA Service Center/OBS/FAD/SCSD
Attn: Leticia Y. Potts
P.O. Box 5400
Albuquerque, NM 87185-5400 |
|--|

HEU MATERIAL SUMMARY
12.1 MTU HEU Down-blending Requirement

This section presents information summarizing the 12.1 metric tonnes (MT) highly enriched uranium (HEU) materials to be provided for down-blending to low enriched uranium (LEU) under this Contract. Table 1 presents the quantities of materials by material grouping. The summary data in this table was compiled using historical information and analytical data for the materials which is considered the best available information at this time. The assay range of material is between 20% and 95% in the Uranium-235 isotope. The number of items and mass information for some material groupings will change due to DOE processing required to size-reduce and/or prepare the materials for packaging and shipment. In addition, material exchanges may also cause small changes within or between the material groupings such as the number of items, assay, and mass information during execution of the project.

**Table 1 Summary of HEU Materials;
Mass by Material Grouping, kg**

<u>Material Grouping</u>	Mass, kg		
	Net	Uranium	U-235
Unalloyed Metal	5611	5608	4469
Alloyed Metal	3958	3394	3047
Oxides	4395	2912	1949
Compounds	620	187	164
Sources and Standards	23	18	12
Reactor Fuel	386	30	26
Totals	14992	12148	9667

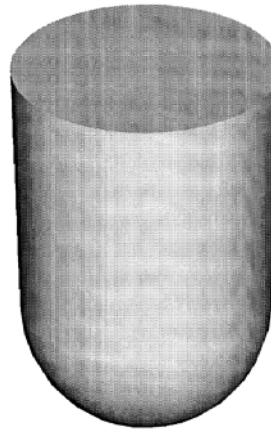
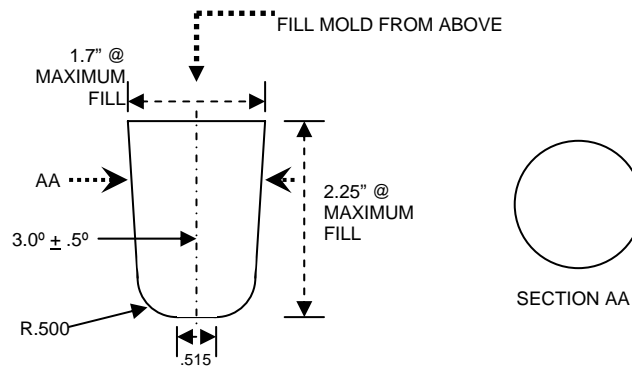
HEU MATERIAL SUMMARY**12.1 MTU HEU Down-blending Requirement (continued)****UNALLOYED METAL**

Unalloyed Metal is uranium metal with trace quantities of elemental impurities. It is estimated that 75% of the Unalloyed Metal will require chemical purification. Some of the remainder will require cross-blending to reduce trace quantities of transuranics and fission products, and elemental contaminants in order to meet the ASTM specification for commercial nuclear fuel when down-blended. The Unalloyed Metal materials are unirradiated; the source of the trace quantities of transuranics and fission products is contamination from reprocessing at other DOE facilities as part of the DOE fuel cycle.

The Unalloyed Metal will be provided either as cast slugs or as broken metal. The unalloyed metal is considered homogenous. The broken metal is produced by breaking hollow cylindrical castings into smaller pieces to facilitate packing into cans. These small pieces of broken castings are sized to fit in either a 4 - 4 ¼ inch diameter by 4 3/8 inch or 8 ¾ inch high can and may be up to ~ 0.75" x 1.5" x 3" in dimension. Each piece typically ranges between 80 and 300 grams. Cans are lined with wire mesh to protect the can surfaces. The slug castings are small, cylindrical-shaped castings. Slug sizes will vary, are not uniform in dimensions and may be irregularly shaped. Nominal dimensions are up to 1.7" in diameter and up to 2.3" tall. The nominal weight of each size of slug is up to 1.6 kg. Figure 1 describes the maximum size of cast slug provided under this work.

HEU MATERIAL SUMMARY
12.1 MTU HEU Down-blending Requirement (continued)

FIGURE 1: CAST SLUG



ALLOYED METAL

Alloyed Metal is uranium metal that has been alloyed with elements such as titanium, stainless steel, aluminum, and zirconium up to one weight percent. These materials contain trace quantities of elemental impurities and will require chemical purification and/or blending in order to meet the ASTM specification for commercial nuclear fuel when down-blended. The Alloyed Metal materials are also unirradiated and may also contain trace quantities of transuranics and fission products. Metal will be provided either as cast slugs as described above or as broken metal.

HEU MATERIAL SUMMARY**12.1 MTU HEU Down-blending Requirement (continued)****OXIDES**

The Oxides grouping consists of nine (9) categories of oxide-type materials:

1. Crucible Skull Oxide: Uranium oxide residues from castings and molds. The oxides are typically in the form of U_3O_8 and will contain large amounts of carbon as well as traces of other materials such as erbium or yttrium. Some of these oxides resulted from the casting of various alloyed metals; therefore, the presence of elements such as molybdenum up to 10 weight percent, and aluminum, chromium, iron, nickel, titanium, and zirconium up to one weight percent are expected.
2. Other Oxide: Predominantly uranium carbide-pyrolytic carbon (UC_2). Other items include carbides and uranium oxides mixed with graphite, rag ash (carbides and U oxides mixed with graphite), U_3O_8 special samples mixed with unusual elements, and U_3O_8 mixed with other metal oxides.
3. Black Oxide: Typically U_3O_8 produced from burning of machine turnings and saw fines from both alloyed and unalloyed metals.
4. Impure Oxide: Various, low-grade uranium oxides containing impurities from recovery processes.
5. Dioxide: Uranium dioxide (UO_2).
6. Trioxide: Uranium trioxide (UO_3).
7. Ceramic Dioxide: Uranium dioxide produced at a high temperature to specific specifications.
8. Mixed Oxide: Uranium oxides of various compounds and/or enrichments.
9. Clinkers and Screenings: Small pieces of uranium metal and alloys, as well as large U_3O_8 particles screened from the casting process.

Quantities of each category of oxide are listed in Table 2. It is assumed that all oxide materials will require chemical purification in order to meet the ASTM

HEU MATERIAL SUMMARY**12.1 MTU HEU Down-blending Requirement (continued)**

specification for commercial nuclear fuel when down-blended.

Table 2. Oxide Categories; Mass, kg

	<i>Skull Oxide</i>	<i>Other Oxide</i>	<i>Black oxide</i>	<i>Impure Oxide</i>	<i>Dioxide</i>	<i>Trioxide</i>	<i>Ceramic Dioxide</i>	<i>Mixed Oxide</i>	<i>Clinkers&Screenings</i>	Totals
Net Wt.	2013	243	336	316	237	30	4	160	1057	4396
Uranium Wt.	1562	118	213	124	59	23	3	27	783	2912
U-235 Wt.	1086	108	95	78	44	11	1	15	511	1949

COMPOUNDS

This material grouping is comprised of mixed uranium compounds which are typically of low purity but can be readily converted to "usable" uranium. These items consist of "known" quantities of uranium and U-235. A list of expected compounds includes uranium peroxide, ammonium diuranate, vacuum cleanings, uranyl fluoride, and purified nitrate crystals. It is assumed that all uranium compounds will require chemical purification in order to meet the ASTM specification for commercial nuclear fuel when down-blended, except for the purified nitrate crystals.

SOURCES AND STANDARDS

Sources and Standards were used to calibrate instrumentation. These items consist of "known" quantities of uranium and U-235 encapsulated within a metal or alloy casing. The encapsulating material is not chemically or metallurgically bonded to the uranium, so the encapsulating material can be removed thus exposing the uranium. It is assumed that some of these materials will require chemical purification in order to meet the ASTM specification for commercial nuclear fuel when down-blended.

HEU MATERIAL SUMMARY**12.1 MTU HEU Down-blending Requirement (continued)****REACTOR FUEL**

The Reactor Fuel material grouping consists of a variety of reactor fuel and reactor fuel related materials. The Reactor Fuel materials are summarized in Table 3 below. It should be assumed that all of these materials will require purification in order to meet the ASTM specification for commercial nuclear fuel.

The Reactor Fuel materials consist primarily of plates and rods. The MTR-type plates are typically U_3O_8 mixed with aluminum powder compressed and clad between aluminum plates, and are near 93% enrichment. Some of the reactor fuel contains other elements such as zirconium or boron.

When possible, reactor fuel materials will be provided in their current form. In some cases, the fuel materials may be size-reduced to facilitate packaging into the ES-3100 shipping containers or may be shipped in an appropriate container (e.g., the ES-4100, a replacement for the 110-gallon 6M, should the package become available).

The U.S. Government represents that the reactor fuel materials will be only slightly irradiated or unirradiated. Such slight irradiation consists of the following:

- Maximum of 10^{-8} grams of plutonium per gram ^{235}U .
- Maximum fission product activity of 10^{-3} millicurie per gram ^{235}U .
- Maximum beta radiation level of five (5) millirem per hour at one (1) inch, or one (1) millirem per hour at one (1) foot from the surface of the fuel materials.
- Maximum gamma radiation level of two (2) millirem per hour at one (1) inch, or one (1) millirem per hour at one (1) foot from the surface.

Reactor Fuel materials will not exceed the aforementioned levels unless otherwise negotiated with the Contractor prior to shipment.

HEU MATERIAL SUMMARY
12.1 MTU HEU Down-blending Requirement

Table 3 Reactor Fuel Summary

Reactor	Fuel Form	Item count	Weight, g			Irradiation History	
			Net	U	U-235	None	Slight
ARMF Idaho	Plates, plate tray	52	89248	3394	3162	X	X
BR2 (Belgium)	Plates	29	187030	15196	13659		X
Bulk Shielding Reactor (ORNL)	Unirradiated fuel assembly scrap plates produced for the Bulk Shielding Reactor. U308 outer and inner plates made of uranium/aluminum alloy, and control rods.	18	3309	3423	3020	X	
CNEA RA-2 (Argentina)	Bundles of MTR-type plates	35	78536	3716	3342	X	
Miscellaneous	Plate	1	24197	1793	1670	X	
PBF PWR	INL PWR Rod standards	4	3107	2196	1405	X	
Reactor Fuel Summary		139	385427	29538	26258		

¹ Some material carries peaceful use foreign obligations between the United States and the European Union and will require special reporting.

HEU MATERIAL SUMMARY
HEU for Unallocated LEU Reserve

SHIPPING CONTAINER SUMMARY

Type B shipping containers, predominately the ES-3100 shipping container, will be used to ship the HEU materials under this contract. Shipping containers must be returned to the Y-12 National Security Complex for reuse. Other Type B shipping containers may also be used as appropriate as described in the reactor fuel section above. When appropriate for the materials being shipped, shipping containers will contain three to six (3 to 6) cans with nominal diameter of 4 - 4.25 inches. Cans typically have press-fit or ring clamp lids and may have a lifting bail to facilitate loading and removal. Tables 4A and 4B list the different heights of the cans that will be used and the number of cans that will be in the shipping containers. After unloading, cans are to be disposed of by the Contractor. Also note that polyethylene or Teflon bottles may also be used and shall be disposed of by the Contractor.

Table 4A. Convenience Cans and Bottles.

HEU Form	Nominal Convenience Cans Height (in)				Bottles	
	4.375	4.875	8.75	10	Poly ¹	Teflon ²
Unalloyed Metal	X	X	X			
Alloyed Metal		X	X			
Oxides		X	X	X	X	X
Compounds			X	X	X	X
Sources and Standards			X	X		

Notes:

1. Poly bottles may be used for shipping "Other Oxides."
2. Teflon bottles used for shipping uranyl nitrate crystals.
3. For metal, sample bottles, vials, or convenience cans containing a drilled sample pack may be inerted with argon. The lids for the inerted containers will have clips holding the lids in place.

HEU MATERIAL SUMMARY
HEU for Unallocated LEU Reserve (continued)

Table 4B. Maximum Number of Cans and Bottles Per Shipping Container.

Container	Nominal Convenience Cans Height (in)				Bottles	
	4.375	4.875	8.75	10	Poly	Teflon
ES-3100	5	5	3	3	3	3

HEU MATERIAL SUMMARY
HEU for Unallocated LEU Reserve (continued)

ANALYTICAL SUMMARIES FOR UNALLOYED METAL AND OXIDES

Tables 5 and 6 are summaries of analytical data from samples of metal and oxide materials that have been previously processed. These data are representative of the HEU materials to be provided under this Contract. Since most of the materials to be provided have not yet been processed, sampled and analyzed, the data in the tables indicate the range and mean levels of various constituents that may be expected in the HEU. Much of the material will be further processed, sampled and/or analyzed during Contract execution; however, the total quantity of metal or oxide estimated to require chemical purification is not expected to increase.

HEU MATERIAL SUMMARY
HEU for Unallocated LEU Reserve (continued)

Table 5. Summary Data for Metal (1969 samples).

Item	Units	Max	Min	Median	Mean	Std Dev
U	wt %	100.00%	85% ¹			
U-232	µg/gU	0.00705	0.00000	0.00000	0.00013	0.00038
U-234	µg/gU	10,970	1,270	9,870	7,837	2,773
U-235	wt %	95%	20%			
U-236	µg/gU	24,120	780	3,560	4,228	3,702
Tc-99	µg/gU	3.19	0.00	0.00	0.01	0.09
TRU	Bq/gU	13,191.0	0.0	12.9	171.8	498.1
FPGamma	MeV Bq/gU	577	0	0	2	27
Al	µg/gU	5,650.0	0.3	10.0	14.4	127.7
Sb	µg/gU	2.0	0.0	0.3	0.5	0.5
As	µg/gU	15.0	0.0	0.3	1.4	2.9
Ba	µg/gU	84.0	0.0	0.3	0.6	2.2
Be	µg/gU	41.0	0.0	0.3	0.4	1.2
Bi	µg/gU	1.0	0.0	0.3	0.4	0.3
B	µg/gU	115.0	0.1	0.3	1.4	7.6
Br	µg/gU	506.0	0.0	5.0	6.1	14.6
Cd	µg/gU	2.0	0.0	0.3	0.3	0.1
Ca	µg/gU	1300.0	0.0	0.6	4.4	34.6
C	µg/gU	979.0	6.0	407.0	390.9	122.1
Cs	µg/gU	1.0	0.0	0.3	0.3	0.2
Cl	µg/gU	973.0	0.0	7.0	9.0	35.6
Cr	µg/gU	1000.0	0.3	11.0	12.6	23.9
Co	µg/gU	91.0	0.0	0.3	0.7	2.6
Cu	µg/gU	105.0	0.3	5.0	5.6	5.6
Dy	µg/gU	17.0	0	0.3	0.3	0.5
Er	µg/gU	233.0	0.0	0.3	2.8	12.5
Eu	µg/gU	1.0	0.0	0.3	0.3	0.1
F	µg/gU	71.0	0.0	7.0	6.8	4.1
Gd	µg/gU	3.0	0	0.3	0.3	0.1
Hf	µg/gU	0.0	0	0.3	0.4	0.3
Fe	µg/gU	1,934.0	0.3	79.0	86.7	78.4
Pb	µg/gU	4.0	0.0	0.3	0.7	1.1
Li	µg/gU	10.0	0.0	0.3	0.4	0.4

HEU MATERIAL SUMMARY
HEU for Unallocated LEU Reserve (continued)

Item	Units	Max	Min	Median	Mean	Std Dev
Mg	µg/gU	51.0	0.1	0.3	0.9	2.4
Mn	µg/gU	69.0	0.3	3.0	3.8	3.6
Hg	µg/gU	7.0	0.0	0.5	0.6	0.3
Mo	µg/gU	273.0	0.0	23.0	26.0	26.2
Ni	µg/gU	270.0	0.3	36.0	38.2	23.6
Nb	µg/gU	20.0	0.0	0.3	2.0	5.1
P	µg/gU	1000.0	0.2	7.0	20.9	46.0
K	µg/gU	202.0	0.0	0.3	2.4	7.2
Ru	µg/gU	2.0	0.0	0.3	0.4	0.2
Sm	µg/gU	2.0	0.0	0.3	0.3	0.2
Se	µg/gU	10.0	0.0	2.0	1.8	1.1
Si	µg/gU	1,500.0	0.3	95.0	124.7	108.3
Ag	µg/gU	410.0	0.0	0.3	0.8	13.3
Na	µg/gU	94.0	0.0	0.3	1.4	4.5
Sr	µg/gU	20.0	0.0	0.3	2.3	5.9
S	µg/gU	260.0	0.2	10.0	15.5	23.0
Ta	µg/gU	230.0	0.1	0.3	2.4	12.9
Th	µg/gU	78.0	0.0	1.8	2.4	6.7
Sn	µg/gU	12.0	0.0	0.3	1.4	2.9
Ti	µg/gU	94.0	0.3	0.8	1.8	4.5
W	µg/gU	899.0	0.0	40.0	45.7	50.9
V	µg/gU	10.0	0.0	0.3	0.5	0.6
Zn	µg/gU	34.0	0.0	0.3	1.7	3.3
Zr	µg/gU	500.0	0.2	4.0	9.8	21.5
TMI	µg/gU	6,916.3	0.0	855.1	864.6	314.3
EBC	µgEB/gU	117.5	0.0	2.5	3.4	7.6

¹ Includes alloyed metal.

HEU MATERIAL SUMMARY
HEU for Unallocated LEU Reserve (continued)

Table 6. Summary Data for Oxide (976 samples).

Item	Units	Max	Min	Median	Mean	Std Dev
U	wt %	86.24%	5.81%			
U-232	µg/gU	0.01269	0.00000	0.00000	0.00007	0.00056
U-234	µg/gU	11,850	1,220	6,415	6,197	3,144
U-235	wt %	95%	20%			
U-236	µg/gU	202,480	310	3,240	3,524	9,016
Tc-99	µg/gU	1,879.48	0.00	0.00	7.25	78.48
TRU	Bq/gU	2,465.8	0.0	58.1	121.6	236.6
FPGamma	MeV					
	Bq/gU	369.0	0.0	0.0	1.0	15.0
Al	µg/gU	2,300.0	1.0	56.0	113.3	184.6
Sb	µg/gU	1,000.0	0.1	0.3	6.3	42.4
As	µg/gU	36.0	0.0	0.3	0.9	2.6
Ba	µg/gU	1,600.0	0.1	1.8	31.0	114.0
Be	µg/gU	700.0	0.0	2.0	9.5	40.3
Bi	µg/gU	34.0	0.1	0.2	0.6	1.7
B	µg/gU	1,400.0	0.1	7.0	50.4	138.2
Br	µg/gU	660.0	0.1	0.4	6.3	32.8
Cd	µg/gU	240.0	0.1	0.3	3.7	15.2
Ca	µg/gU	1,500.0	1.3	62.0	211.7	305.3
C	µg/gU	374,000.0	13.0	5,420.0	19,407.7	36,581.3
Cs	µg/gU	19.0	0.0	0.2	0.5	1.3
Cl	µg/gU	2,470.0	0.6	19.0	83.5	177.9
Cr	µg/gU	11,000.0	1.0	20.0	101.2	407.5
Co	µg/gU	697.5	0.0	1.0	6.0	30.5
Cu	µg/gU	6500.0	0.3	14.0	123.0	403.4
Dy	µg/gU	30.0	0.2	0.6	1.3	2.5
Er	µg/gU	470,000.0	0.2	3.0	4,753.5	33,226.6
Eu	µg/gU	14.0	0.1	0.3	0.6	1.0
F	µg/gU	1490.0	0.1	2.5	41.4	129.5
Gd	µg/gU	160.0	0.2	0.8	1.5	5.6
Hf	µg/gU	2,400.0	0.2	1.0	41.8	144.2
Fe	µg/gU	23,000.0	0.7	120.0	305.0	968.6
Pb	µg/gU	780.0	0.1	0.8	14.4	57.0
Li	µg/gU	315.1	0.0	1.0	5.2	22.4

HEU MATERIAL SUMMARY
HEU for Unallocated LEU Reserve (continued)

Item	Units	Max	Min	Median	Mean	Std Dev
Mg	µg/gU	4,700.0	0.1	13.3	73.5	229.5
Mn	µg/gU	1,200.0	0.2	10.0	46.3	116.5
Hg	µg/gU	94.0	0.2	0.7	1.4	3.6
Mo	µg/gU	3,900.0	0.1	18.0	52.7	161.9
Ni	µg/gU	1,100.0	1.3	36.1	88.5	165.9
Nb	µg/gU	2,200.0	0.0	0.3	12.5	87.0
P	µg/gU	1,000.0	0.1	17.0	59.1	137.4
K	µg/gU	2,700.0	0.1	15.0	87.0	209.4
Ru	µg/gU	71.0	0.1	0.4	1.6	4.7
Sm	µg/gU	29.0	0.2	0.6	1.1	2.3
Se	µg/gU	130.0	0.0	0.2	1.7	7.7
Si	µg/gU	3,500.0	10.0	201.4	297.4	293.1
Ag	µg/gU	880.0	0.1	0.6	3.9	31.2
Na	µg/gU	2,400.0	0.1	13.0	80.1	207.2
Sr	µg/gU	460.0	0.0	0.8	8.8	34.1
S	µg/gU	32,300.0	0.3	32.0	206.7	1213.1
Ta	µg/gU	5,100.0	0.1	1.4	17.0	177.5
Th	µg/gU	4,500.0	0.1	0.6	36.5	184.9
Sn	µg/gU	810.0	0.1	2.0	21.8	62.4
Ti	µg/gU	1,300.0	0.2	8.2	36.5	119.3
W	µg/gU	1,101.9	0.0	7.0	35.5	103.9
V	µg/gU	320.0	0.0	1.0	6.3	16.7
Zn	µg/gU	1,500.0	0.1	5.0	42.9	131.6
Zr	µg/gU	16,000.0	0.4	23.0	113.8	610.5
TMI	µg/gU	603,870.1	209.5	4,565.8	18,792.0	45,081.1
EBC	µgEB/gU	6,421.7	1.8	15.9	96.0	368.2

Specification for LEU Derived from HEU

January 9, 2008

Specified Item	Symbol	Units	Limit	Value	Notes	EBC Factor
U-232	U-232	μg/gU	≤	0.00010		
U-234	U-234	μg/gU-235	≤	10,000	1	
U-235	U-235	wt %	=	4.95%	2	
U-236	U-236	μg/gU	≤	250	1	
Tc-99	Tc-99	μg/gU	≤	0.010		
Trans-Uranics (Np, Pu)	TRU	Bq/gU	≤	3.3	3	
Fission Product Gamma	Gamma	MeV Bq/gU	≤	10	4	
Aluminum	Al	μg/gU	≤	150	5	0.0000
Barium	Ba	μg/gU	≤	5	5	0.0000
Beryllium	Be	μg/gU	≤	100	5	0.0000
Bismuth	Bi	μg/gU	≤	3	5	0.0000
Boron	B	μg/gU	≤	EBC	5, 6	1.0000
Cadmium	Cd	μg/gU	≤	EBC	5, 6	0.3172
Calcium	Ca	μg/gU	≤	75	5	0.0002
Carbon	C	μg/gU	≤	100	5	0.0000
Cesium	Cs	μg/gU	≤	EBC	5, 6	0.0031
Chlorine	Cl	μg/gU	≤	100	5	0.0132
Chromium	Cr	μg/gU	≤	100	5	0.0008
Cobalt	Co	μg/gU	≤	80	5	0.0089
Copper	Cu	μg/gU	≤	100	5	0.0008
Dysprosium	Dy	μg/gU	≤	EBC	5, 6	0.0818
Erbium	Er	μg/gU	≤	EBC	5, 6	0.0135
Europium	Eu	μg/gU	≤	EBC	5, 6	0.4250
Fluorine	F	μg/gU	≤	100	5	0.0000
Gadolinium	Gd	μg/gU	≤	EBC	5, 6	4.3991
Hafnium	Hf	μg/gU	≤	EBC	5, 6	0.0083
Iron	Fe	μg/gU	≤	150	5	0.0006
Lead	Pb	μg/gU	≤	40	5	0.0000
Lithium	Li	μg/gU	≤	EBC	5, 6	0.1439
Magnesium	Mg	μg/gU	≤	75	5	0.0000
Manganese	Mn	μg/gU	≤	50	5	0.0034
Mercury	Hg	μg/gU	≤	EBC	5, 6	0.0263
Molybdenum	Mo	μg/gU	≤	200	5	0.0004
Nickel	Ni	μg/gU	≤	80	5	0.0011

Specification for LEU Derived from HEU

January 9, 2008

Phosphorus	P	μg/gU	≤	100	5	0.0000
Potassium	K	μg/gU	≤	50	5	0.0006
Samarium	Sm	μg/gU	≤	EBC	5, 6	0.5336
Silicon	Si	μg/gU	≤	200	5	0.0000
Silver	Ag	μg/gU	≤	EBC	5, 6	0.0083
Sodium	Na	μg/gU	≤	20	5	0.0003
Strontium	Sr	μg/gU	≤	50	5	0.0002
Tantalum	Ta	μg/gU	≤	200	5	0.0016
Thorium	Th	μg/gU	≤	10	5	0.0004
Tin	Sn	μg/gU	≤	50	5	0.0000
Titanium	Ti	μg/gU	≤	50	5	0.0018
Tungsten	W	μg/gU	≤	100	5	0.0014
Vanadium	V	μg/gU	≤	10	5	0.0014
Zinc	Zn	μg/gU	≤	20	5	0.0002
Zirconium	Zr	μg/gU	≤	50	5	0.0000
Total Measured Impurities	TMI	μg/gU	≤	1,500	7	
Equivalent Boron Content	EBC	μg/gU	≤	4	6	

Notes

1. It is recognized that not all of the HEU supplied under the LEU Inventory requirement can be down-blended to meet these limits for U-234 and U-236. The Contractor should use its best efforts in cross-blending and selection of diluents to meet these limits where possible.
2. The U-235 assay tolerance is $\pm 0.05\%$.
3. The TRU activity is the sum of the measured activity for isotopes of elements above uranium in the periodic chart. At a minimum, Np-237, Pu-238, Pu-239, and Pu-240 shall be measured and included in this sum.
4. The gamma energy of Fission products shall be measured as per ASTM specification C1295-98 "Gamma Energy Emission from Fission Products in Uranium Hexafluoride and Uranyl Nitrate Solution", or an equivalent method.
5. Impurities shall be measured to an accuracy of $\pm 25\%$ via ICP mass spectroscopy or equivalent.

Specification for LEU Derived from HEU

January 9, 2008

6. Items marked EBC are jointly limited by the 4 $\mu\text{g/gU}$ EBC Limit. The EBC Calculation & factors are defined in ASTM C1233-03, "Standard Practice for Determining Equivalent Boron Contents of Nuclear Materials". The EBC limit is the sum of the concentration of each item marked EBC times its respective EBC factor.
7. The total measured impurities is the sum of the concentrations of all of the named elemental impurities listed, including those marked EBC.

Planned HEU Delivery Schedule

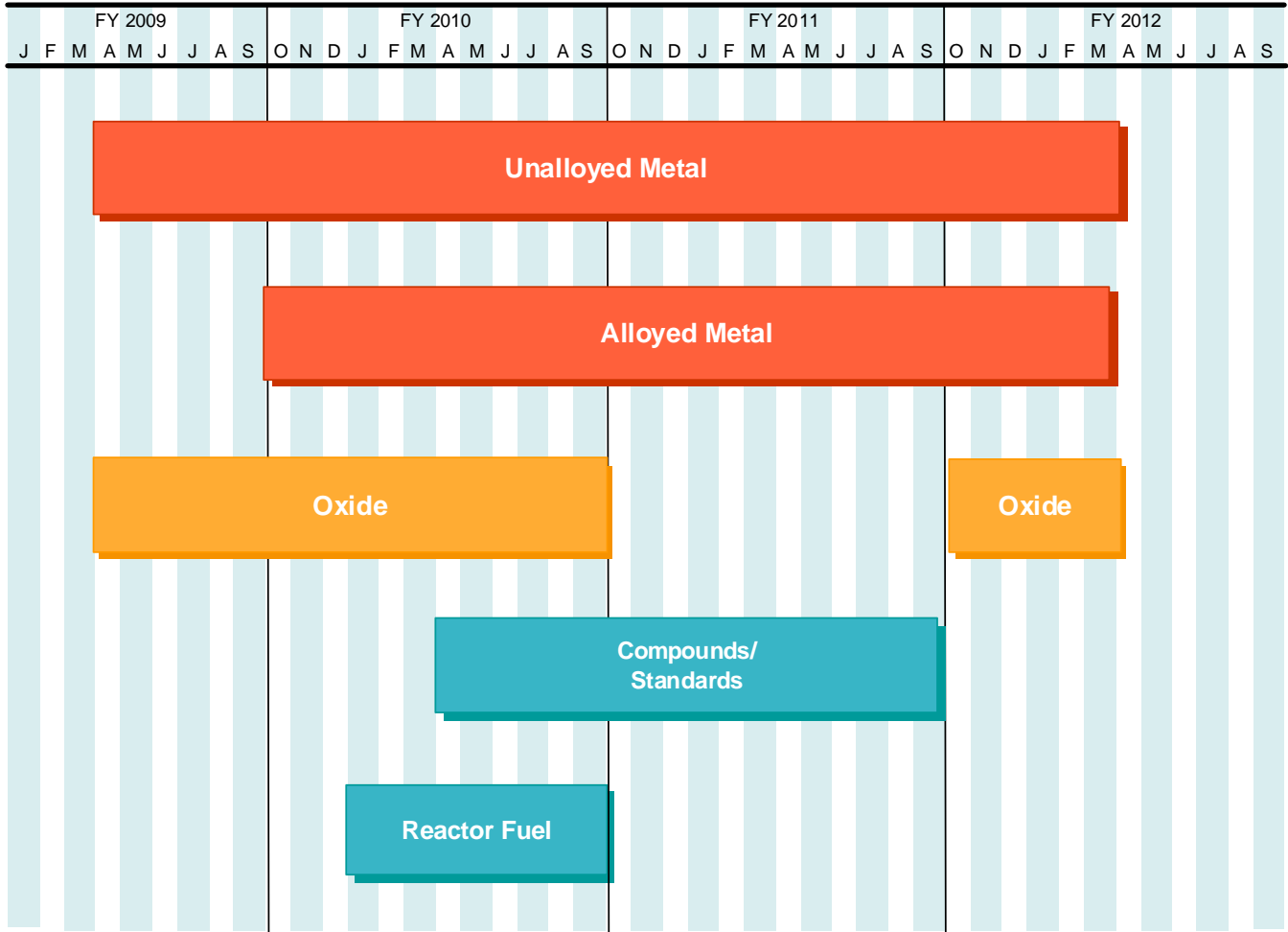


Figure 1 Planned Shipping Schedule Summary

Fiscal Year	HEU	~ Net (kg)	~ U (kg)	# Containers	Sum Net (kg)	Sum U (kg)
2009	Unalloyed Metal	1881	1880	102	3819	3168
	Alloyed Metal	0	0	0		
	Oxide	1938	1288	172		
	Compounds/Standards	0	0	0		
	Rx Fuel	0	0	0		
2010	Unalloyed Metal	1080	1080	58	4400	3173
	Alloyed Metal	712	600	32		
	Oxide	2078	1380	184		
	Compounds/Standards(1)	137	77	13		
	Rx Fuel	393	36	107		
2011	Unalloyed Metal	1441	1440	78	4740	3967
	Alloyed Metal	2799	2400	130		
	Oxide	0	0	0		
	Compounds/Standards	500	127	21		
	Rx Fuel	0	0	0		
2012	Unalloyed Metal	1209	1208	65	2036	1846
	Alloyed Metal	459	394	21		
	Oxide	367	244	33		
	Compounds/Standards	0	0	0		
	Rx Fuel	0	0	0		
Totals	Unalloyed Metal	5611	5608	303	14992	12148
	Alloyed Metal	3970	3394	183		
	Oxide	4384	2912	389		
	Compounds/Standards	637	204	34		
	Rx Fuel	390	30	107		
	Totals	14992	12148	1016	14992	12148

(1) UNH from Other than Y-12

LIST OF APPLICABLE DOE DIRECTIVES

May 1, 2008

In addition to the list of applicable directives listed below, the Contractor shall also comply with supplementary directives (e.g., manuals), which are invoked by a Contractor Requirements Document (CRD) attached to a directive. Electronic copies of these documents are available at the following Websites:

<http://directives.doe.gov/cgi-bin/currentchecklist>
<http://www.directives.doe.gov/directives/globsearch-adv.html>
<http://www.nnsa.doe.gov/>
<http://www.eh.doe.gov/techstds/standard/standard.html>

DIRECTIVE NUMBER	TYPE	DOE DIRECTIVE TITLE
DOE M 470.4-4 Chg 1	Manual	Information Security
DOE M 471.1-1 Chg 1	Manual	Identification and Protection of Unclassified Controlled Nuclear Information Manual
DOE O 471.1A	Order	Identification and Protection of Unclassified Controlled Nuclear Information
DOE O 471.3	Order	Identifying and Protecting Official Use Only Information
DOE M 471.3-1	Manual	Manual for Identifying and Protecting Official Use Only Information
DOE G 471.3-1	Guide	Guide to Identifying Official Use Only Information
DOE M 475.1-1A	Manual	Identifying Classified Information
DOE P 205.1	Policy	Departmental Cyber Security Management Policy
DOE M 205.1-3	Manual	Telecommunications Security Manual

DEFINITIONS

September 26, 2008

As used throughout this Contract, the following terms shall have the meanings set forth below:

1. "Act" means the Atomic Energy Act of 1954, as amended.
2. "Assay" means the total weight of U-235 per kilogram of Material divided by the total weight of all uranium isotopes per kilogram of Material, the quotient of which is multiplied by 100 and expressed as a weight percent.
3. "Business Day" means a day that is not a Saturday, Sunday or observed as a United States Legal Holiday. Unless this term is used, references in this Contract to "day" or "days" refer to a calendar day or calendar days, respectively.
4. "Category 1 Quantities of HEU" means strategic special nuclear material in any combination in a quantity of 5000 grams or more computed by the formula, $\text{grams} = (\text{grams contained U-235}) + 2.5 (\text{grams U-233} + \text{grams plutonium})$
5. "Consumed" or "Consumption" and "Lost" or "Losses" means the reduction in quantity of material that is due to the blending of different assays of Special Nuclear Material or other alteration of the isotopic ratio, processing losses, and the disposition of material in such a manner that it cannot be economically recovered for further use.
6. "Contracting Officer" means a person employed by the Government with the written authority to enter into, administer, and/or terminate contracts and make written determinations on behalf of the Government in accordance with applicable laws, regulations, and procedures.
7. "Derived Low Enriched Uranium" or "Derived LEU" means the Low Enriched Uranium resulting after the blend-down of the HEU to Derived LEU under this Contract.
8. "EBC" means the Equivalent Boron Content as defined in ASTM International Standard C1233-97.
9. "Fiscal Year" means a period of twelve months encompassing October 1 of the calendar year preceding the designated year through September 30 of the designated year, e.g. FY 2008 is October 1, 2007 through September 30, 2008.

10. "Full Market Value" is defined as the sum of the Market Value of Feed Component and the Market Value of Separative Work Unit (SWU) Component. The Feed Component (including U_3O_8 and conversion) and the SWU Component shall be calculated using a reference tails assay of 0.25% and a reference feed assay of 0.711%.
11. "Government LEU Account" means the quantities of Derived LEU produced under the contract from the down-blending of HEU, as well as any UF_6 or other LEU converted or exchanged for such Derived LEU, which will be debited and credited in accordance with Section J, Attachment 2, "Holding Agreement."
12. "Highly Enriched Uranium" or "HEU" means uranium enriched to 20 percent or more of the uranium-235 isotope. For purposes of this Contract, it includes HEU in the form of metal, oxide, and Reactor Fuel.
13. "Low Enriched Uranium" or "LEU" means uranium enriched to more than 0.711 percent and less than 20 percent of the uranium-235 isotope, including that which is derived from highly enriched uranium. For purposes of this Contract, LEU includes that derived from the HEU (Derived LEU), in any chemical form, placed in storage for the Low Enriched Uranium Inventory.
14. "Metric Ton Uranium or "MTU" means the weight of uranium in a uranium-bearing material; an MTU is 1,000 kilograms (or 2,200 pounds) of uranium.
15. "National Nuclear Security Administration (NNSA)" means a separately organized agency within the Department of Energy or any successor agency of the Federal Government.
16. "Physical Delivery" means the loading of UF_6 by the Contractor onto the Government's or its designee's conveyance/truck or aircraft.
17. "Reactor Fuel" means HEU meeting the reactor fuel description in Section J, Attachment 1.
18. "Remainder LEU" means the total balance of the Government LEU Account less 40 MTU that shall be physically maintained at the Contractor's facility in the form of UF_6 in accordance with Section J, Attachment 2, "Holding Agreement."
19. "Source Material" means uranium, thorium, or any other nuclear material determined, pursuant to 42 U.S.C. § 2091, to be source material, or ores containing one or more of the foregoing materials in such concentration as may be determined by regulation.

20. "Special Nuclear Material" or "SNM" means plutonium, uranium-233, uranium enriched in the isotope U-235, and any other material which, pursuant to 42 U.S.C. 2071 (Section 51, as amended, of the Atomic Energy Act of 1954), has been determined to be special nuclear material, but does not include source material; it also includes any material artificially enriched by any of the foregoing, not including source material. For purposes of this Contract, SNM includes both HEU and LEU.
21. "Umpire Sample" means a sample taken, prepared, and stored in an agreed upon manner as provided under the Shipper Receiver Agreement for the purpose of settling a uranium and U-235 measurement difference.
22. "Unobligated Diluent" means the natural or other low-assay uranium procured by the Contractor to down-blend the HEU under this Contract, which does not have peaceful use restrictions and the cost of which is included in the unit prices prescribed in Section B, CLIN 0001.
23. "Uranium-235" or "U-235" or ^{235}U means a fissionable uranium isotope with atomic mass number 235.

U.S. Department of Energy

CONTRACT SECURITY CLASSIFICATION SPECIFICATION (CSCS)

- 1 -

1. CSSC No.:		2. Previous CSCS No.:		3a. Reason for Action: (Check One) <input type="checkbox"/> Add <input type="checkbox"/> Change <input type="checkbox"/> Terminate b. Item Numbers Modified:	
4. This Specification Is For: (Complete as Applicable)				5. Specification Is: (Complete as Applicable)	
(Check One) a. <input type="checkbox"/> Contract or Other Number <input type="checkbox"/> Solicitation Contract Type: _____ b. Contract Number: _____ End Date: _____ (Estimated) c. Contract Number of Prime: _____ End Date: _____ (Complete if registering or soliciting a subcontract) (Estimated)				a. Original (Complete data in all cases) Date	
				b. Revised (Supercedes all previous specifications) Date	
				c. Certificate of Possession Date	
				Retention of Classified Matter is Authorized Until Date	
				d. Final Date	
				Certificate of Non-Possession or Equivalent Date	
6. General Identification of this Procurement					
7. Contractor					
a. Facility Code		b. Name, Address, and Zip Code		c. Cognizant Security Office (Name, Address, and Zip Code)	
8. Prime Contractor (Complete if registering or soliciting a subcontract)					
a. Facility Code		b. Name, Address, and Zip Code		c. Cognizant Security Office (Name, Address, and Zip Code)	
9. Actual Place of Performance (DOE Facilities) (Attach additional entries as necessary on page 3)					
a. Facility Code		b. Name, Address, and Zip Code		c. Cognizant Security Office (Name, Address, and Zip Code)	
Actual Place of Performance (NON DOE Facilities) (Attach additional entries as necessary)					
a. ID Code		b. Name, Address, and Zip Code		c. Cognizant Security Office (Name, Address, and Zip Code)	
10. Clearance and Storage (enter level and category) a. Classification of Matter to be Accessed: <input type="checkbox"/> TSRD <input type="checkbox"/> TSFRD <input type="checkbox"/> TSNSI <input type="checkbox"/> SRD <input type="checkbox"/> SFRD <input type="checkbox"/> SNSI <input type="checkbox"/> CRD <input type="checkbox"/> CFRD <input type="checkbox"/> CNSI <input type="checkbox"/> U b. Level of Storage Required at Contractor Facility: <input type="checkbox"/> TSRD <input type="checkbox"/> TSFRD <input type="checkbox"/> TSNSI <input type="checkbox"/> SRD <input type="checkbox"/> SFRD <input type="checkbox"/> SNSI <input type="checkbox"/> CRD <input type="checkbox"/> CFRD <input type="checkbox"/> CNSI <input type="checkbox"/> U c. Level of Storage for this Contract: <input type="checkbox"/> TSRD <input type="checkbox"/> TSFRD <input type="checkbox"/> TSNSI <input type="checkbox"/> SRD <input type="checkbox"/> SFRD <input type="checkbox"/> SNSI <input type="checkbox"/> CRD <input type="checkbox"/> CFRD <input type="checkbox"/> CNSI <input type="checkbox"/> U d. Access Authorization: <input type="checkbox"/> Q <input type="checkbox"/> L				11. This Contract Will Require Access To: <input type="checkbox"/> SCI <input type="checkbox"/> OTHER DCI CAVEATS <input type="checkbox"/> COMSEC <input type="checkbox"/> FGI <input type="checkbox"/> NATO <input type="checkbox"/> WD/SIGMAS: _____ <input type="checkbox"/> OTHER: _____	
12. In Performing this Contract, the Contractor Will:					
<input type="checkbox"/> Have Access to Classified Information Only at Another Contractor's Facility or a Government Activity <input type="checkbox"/> Generate Classified Matter <input type="checkbox"/> Perform Services That Require Unescorted Access to Security Areas <input type="checkbox"/> Have Access to U.S. Classified Information Outside the U.S., Puerto Rico, U.S. Possessions and Trust Territories <input type="checkbox"/> Other (Specify)				<input type="checkbox"/> Receive Classified Matter <input type="checkbox"/> Fabricate, Modify, or Store Classified Items (e.g., Hardware or Substances) <input type="checkbox"/> Be Authorized to Use the Services of the Office of Scientific & Technical Information to Receive Classified Matter <input type="checkbox"/> Require a COMSEC Account <input type="checkbox"/> Be Authorized to Use the Defense Courier Service	

13. Classification Guidance

The classification guidance needed for this classified effort is identified below. Note: Guidance which is in itself classified should be referenced here and provided under separate cover.

14. Security Requirements

Security requirements are established for this contract and are identified in the following contracts/solicitation clauses.

- ☐ DEAR 952.204-2 Security Requirements ☐ DEAR 952.204-73 Facility Clearance (Solicitation)
☐ DEAR 952.204-70 Classification/Declassification ☐ DEAR 970.5204.1 Counterintelligence (for management contracts ONLY)

15. Surveys

DOE Surveying Office Is _____

Elements of this contract are outside the survey responsibility of the Cognizant Security Office and/or the Surveying Office.

- ☐ No ☐ Yes (Identify specific areas and provide explanation/justification for each)

16. Certification and Signature. Security requirements stated herein are complete and adequate for safeguarding the classified information to be released or generated under this classified contract. All questions shall be referred to the official named below:

a. Typed Name of Procurement Request Originator

b. Title and Organization

c. Telephone (Include Area Code)

d. Address (Include Zip Code)

e.

Signature _____

Date _____

17. Typed Name of Contracting Official

Signature _____

Date _____

18. Typed Name of Classification Officer (Approval of Block 13)

Signature _____

Date _____

19a. Typed Name of Local DOE Security Officer

Signature _____

Date _____

a. Responsible Office

20. Required Distribution

- ☐ Contractor ☐ Administering Contracting Officer
☐ Subcontractor ☐ Surveying Office If Different than Cognizant Security Office
☐ Cognizant Security Office ☐ Others, as Necessary

21. General Comments:

[illegible]